

7.0 EVALUATION OF PROPOSED REMEDIAL ALTERNATIVES

7.1 THRESHOLD CRITERIA

All the proposed alternatives protect human health and the environment, comply with cleanup standards, comply with applicable state and federal laws, and provide for compliance monitoring. All proposed alternatives rely on containment measures, natural attenuation, institutional controls, and ground water monitoring with one alternative providing for a partial removal and treatment of contaminated soils.

The 2-feet of gravel in the ATC area and the existing fill material in the former SGP property that cover the contaminated soils in Alternatives A, D, and E would serve as a barrier to prevent direct exposure to contaminated soils. The low permeability cap over the contaminated area in Alternative B would further prevent direct exposure and reduce the amount of infiltration through the impacted soils. The stormwater drainage system in Alternative B would prevent precipitation surface runoff from infiltrating into the contaminated soils. In Alternative C, after remediation is complete, direct contact with contaminated soils from the surface to near the water table would be further reduced beyond Alternatives A, D, and E, by the presence of 15 feet of clean soil.

All alternatives rely on natural attenuation to prevent migration of chemicals of concern in ground water at rates that would cause exceedances of cleanup levels outside of the impacted soil area or in the Spokane River. A ground water monitoring program would be used to identify changes in site conditions as a result of contamination left on Site and to assess compliance at appropriately selected wells that would ensure that natural attenuation continues to occur and cleanup levels are not exceeded at these wells.

Long-term institutional controls that restrict ground water use to prevent exposure to contaminated ground water would be required for all alternatives. Institutional controls would also restrict activities on the Site that may result in the release or exposure of contaminated soil that was contained as part of the cleanup action; restrictions on such activities would be less under Alternative C since soil cleanup levels would be met for the top 15 feet.

The barrier wall in Alternative D and the bioengineered slope in Alternative E would serve to reduce the rapid interaction between the groundwater and the river water and thus reduce or delay migration of Site groundwater to the Spokane River. The bioengineered slope of Alternative E would also provide a combination of erosion control and riparian corridor enhancement.

Soil cleanup standards would be met from the ground surface to fifteen feet below the ground surface under Alternative C. All alternatives would comply with soil cleanup standards under WAC 173-340-740(6)(d) that says:

The department recognizes that, for those cleanup actions selected under WAC 173-340-360 that involve containment of hazardous substances, the soil cleanup levels will typically not be met at the points of compliance in (b) and (c) of this subsection. In these cases the cleanup action may be determined to comply with cleanup standards, provided that the compliance monitoring program is designed to ensure the long-term integrity of the containment system, and the other requirements for containment technologies in WAC 173-340-360(8) are met.

Periodic inspections and maintenance of the gravel and fill material cover under Alternatives A, D, and E, and of the low permeability cover in Alternative B would ensure the long-term integrity of the containment system. Ground water cleanup standards would be met at the conditional points of compliance to be located as close as practicable to the source of hazardous substances, not to exceed the property boundary as specified in WAC 173-230-720(6)(c).

All alternatives would comply with the applicable state and federal laws (ARARs). These ARARs are identified in the FS Report.

All alternatives provide for compliance monitoring.

7.2 OTHER REQUIREMENTS

7.2.1 Use of Permanent Solutions to the Maximum Extent Practicable

When selecting a cleanup action, preference is given to permanent solutions to the maximum extent practicable. A permanent solution is one in which cleanup standards can be met without further action required at the site. Ecology recognizes that permanent solutions may not be practicable for all sites. The criteria for evaluating whether a solution is permanent to the maximum extent practicable are discussed individually below and a comparison of the alternatives with the criteria is shown in Table 8. This Table uses a scale of 1 to 10 with 10 being the most favorable.

7.2.1.1 Overall Protection of Human Health and the Environment

The current potential human health risks identified at the Site are attributed to soil exposure and consumption of ground water. Future risks are possible due to the potential migration or exposure of contamination left on Site. The Site remedial action objectives provide for preventing or controlling current risks as well as preventing/monitoring future migration of contaminants to the Spokane River and to ground water outside the contaminated area. An evaluation of the ability of each alternative to meet RAOs is included in Table 9.

All five alternatives would prevent direct human exposures to contaminated soils. Direct contact with contaminated soils would be prevented by the gravel cover or existing fill materials under Alternatives A, D, and E. Alternative B would prevent direct contact to contaminated soils

exposure through the installation of a low permeability cap. Shallow excavation of soil and filling to 15 feet with clean soils provided for in Alternative C would represent the reasonable estimate of depth of soil that could be excavated and distributed at the soil surface as a result of site development activities. All alternatives provide for deed restrictions that would reduce risk to human health by implementing ground water and land uses restrictions that could cause unacceptable risk to human health including risks to workers or visitors at the Site.

Of the five alternatives presented, Alternative C is the most protective of human health and the environment. The least protective is Alternative A. Alternatives D and E rank slightly higher than A; although off-site transport of contaminants is not occurring at levels that are considered significant under current conditions, these alternatives include elements that would prevent erosion of contaminated soils and may mitigate future off-site migration to the Spokane River. Alternatives B and C would reduce leaching of contaminants from the soils to ground water. However, because most of the contaminated soil is in ground water, the reduction of leaching is not expected to significantly impact overall water quality at the site under current conditions. All alternatives rely on natural attenuation to prevent off-site transport of contaminants in ground water at rates that are considered significant. Ground water monitoring would be used to identify changes in site conditions relating to the fate and transport of contaminants.

7.2.1.2 Long Term Effectiveness

After completion of soil removal and treatment, the partial removal of contaminated soils in Alternative C would provide a greater level of long-term effectiveness over the other alternatives in terms of long-term dermal contact with soil in the upper 15 feet of the Site. Alternative B, which provides for a low permeability cap to prevent exposure to contaminated soils and to minimize leaching by preventing infiltration, is the next highest in terms of long-term effectiveness. Alternatives D and E, which address the potential for future migration to the river, are slightly higher than Alternative A. All alternatives rely on institutional controls to prevent consumption of ground water and to prevent exposures to contaminated soils left on site and to protect the integrity of the containment remedy. Long-term ground water monitoring, maintenance of the cover/cap system would be designed to provide long-term success.

7.2.1.3 Short Term Effectiveness

Alternative A has the highest degree of short-term effectiveness because there is little to no new exposure or disturbance to contaminated soils or ground water. Alternative C has the lowest degree of short-term effectiveness because the excavation and off-site transportation and treatment of contaminated soils involve a level of short-term risk to site workers; these impacts could be minimized and mitigated through a variety of measures. Alternatives D and E would involve risks to worker during construction of the barrier wall or streambank bioengineering.

7.2.1.4 Permanent Reduction in Toxicity, Mobility, and Volume of Hazardous Substances

Alternative C that involves shallow soil excavation and off-site treatment of soils would provide the maximum reductions in toxicity, mobility, and volume among the proposed alternatives. In all of the alternatives, natural attenuation provides some measure of reduction in the toxicity of the ground water. Limited capping provided under Alternatives A, D, and E would provide reduction of exposure but not the reduction in mobility since infiltration is not being prevented. The low permeability cap of Alternative B would reduce the mobility and exposure to toxicity to a greater degree than Alternatives A, D, and E.

7.2.1.5 Implementability

Alternative A is the easiest to implement with Alternative C the most difficult to implement.

7.2.1.6 Cleanup Costs

Table 10 shows the cleanup costs. The costs developed for this document were obtained from the Feasibility Study Report and are intended for comparison purposes only.

7.2.2 Provide for a Reasonable Restoration Time Frame

Criteria for establishing a reasonable restoration time frame are outlined in WAC 173-340-360(6). All proposed alternatives require some level of on-site containment and rely on natural attenuation to reduce concentrations in ground water. All alternatives are consistent with the current use of the site; potential exposures due to future site use or development are addressed through institutional controls. All alternatives have the ability to monitor migration of contaminants from the Site with Alternatives D and E having the slight ability to mitigate future migration to the river. Alternative C ranks higher over the other alternatives in terms of providing for a reasonable restoration time frame because of the partial removal of soils and less restriction on land use. All other alternatives rank almost equally in terms of providing for a reasonable restoration time frame.

7.2.3 Consider Public Concerns Raised During Public Comment on the Draft Cleanup Action Plan

Ecology provides the public for an opportunity to review and comment on the Draft Cleanup Action Plan during a 30-day public comment period

7.3 CLEANUP TECHNOLOGY PREFERENCE

All proposed alternatives rely on containment measures, institutional control, and monitoring. Natural attenuation occurring in ground water constitutes destruction of the hazardous substances. Alternative C ranks the highest as it includes shallow soil removal and off-site treatment. All other alternatives rank equally since all involve isolation or containment with attendant engineering controls; and institutional controls and monitoring.